International Conference on Economics - TEA 2014
Global stability and Growth and the State of Economics

MACROECNOMIC VOLATILITY AND ECONOMIC GROWTH: EMPIRICAL ESTIMATION FOR THE CEE REGION

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INTRODUCTION

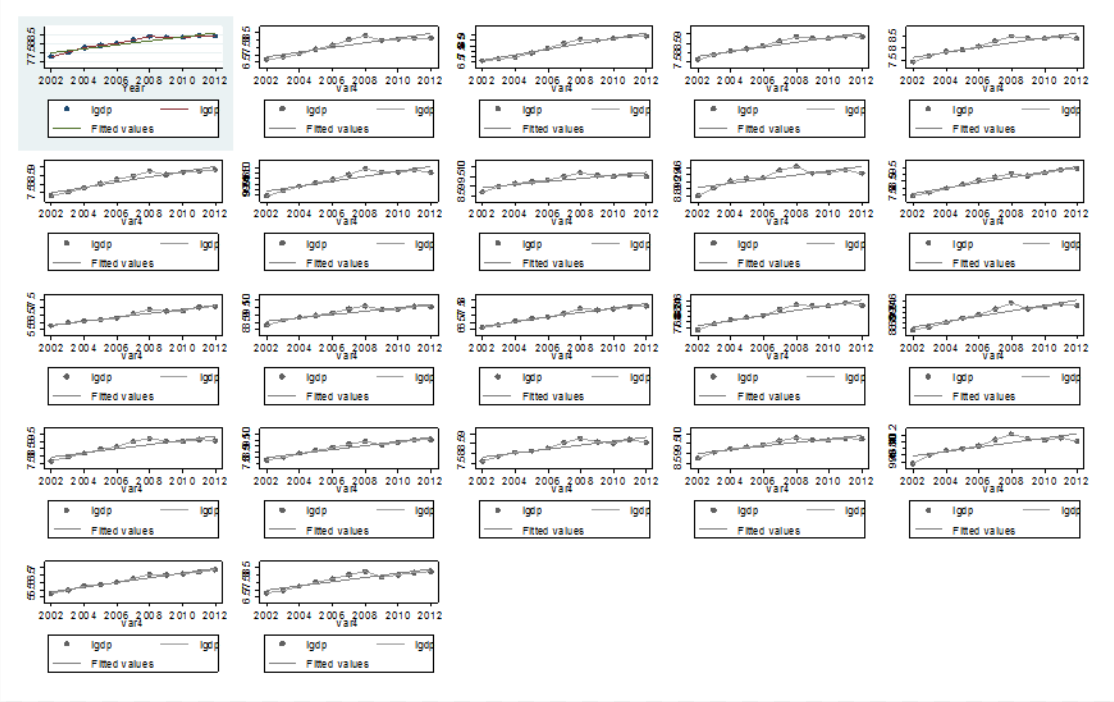
The main goal of the paper (to investigate how macroeconomic volatility affects economic growth by applying panel regression analysis for a group of CEE countries)

The theoretical background (business cycles and economic growth)

Research Methodology (Ordinary Least Square - OLS and General Method of Moments - GMM)

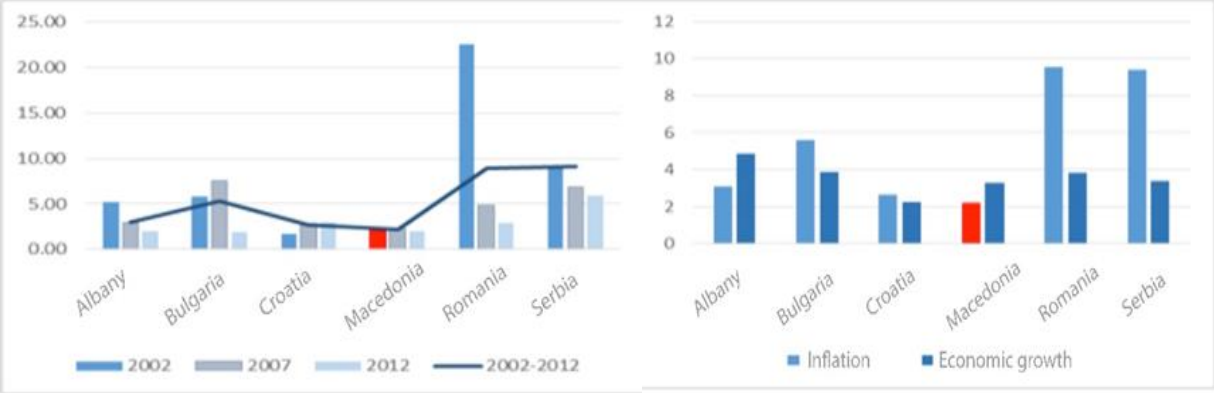
MACROECONOMIC PERFORMANCE AND ECONOMIC GROWTHIN THE CEE COUNTRIES

Output fluctuations(output volatility) of the CEE countries and the long-term growth path (the cyclical and trend component of real GDP per capita).



MONETARY POLICY PERFORMANCE AND ECONOMIC GROWTH

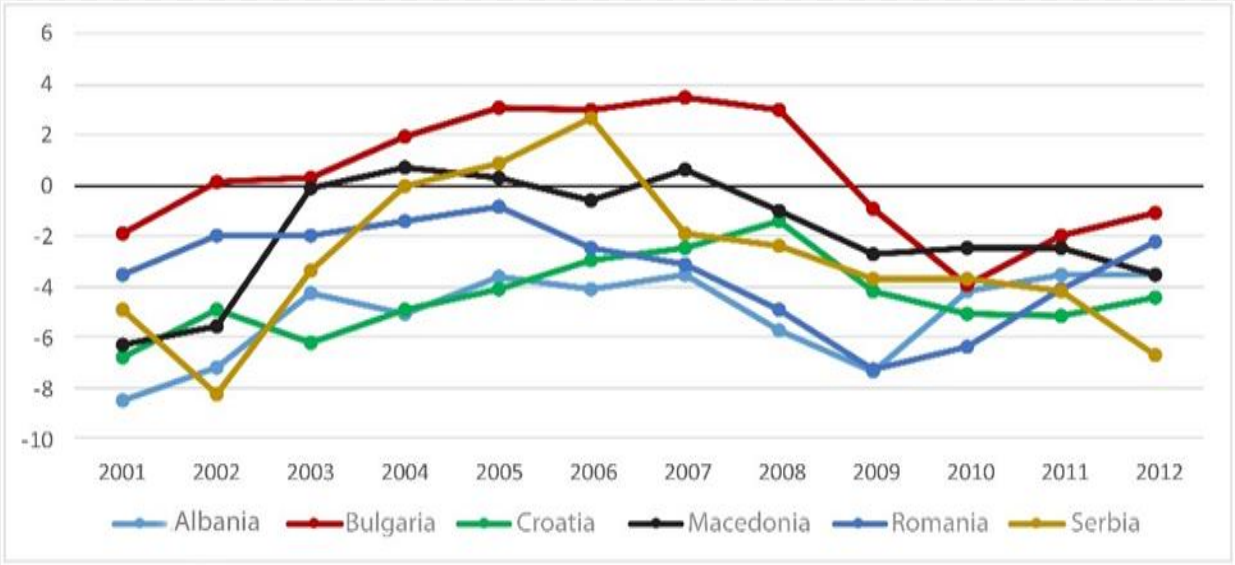
One of the monetary policy performance instruments is the inflation rate level



The results of our estimation show that there is no negative correlation between inflation rate and economic growth in the analyzed period which is at odds with the standard macroeconomic theory. The data indicate that countries with higher inflation rate have experienced higher growth rates.

FISCAL POLICY PERFORMANCE AND ECONOMIC GROWTH

The fiscal performance instrument that we use in macroeconomic performance comparative analysis is budget deficit



BUSINESS CYCLES, MACROECONOMIC VOLATILITY AND ECONOMIC GROWTH: LITERATURE REVIEW

The link between volatility and growth could be happening through uncertainty. *Feeney* (1999) argues that risk sharing (through trade) and the associated decrease in uncertainty and volatility can have positive effects on growth.

An endogenous growth model can also introduce general equilibrium effects of uncertainty on growth through investment, consumer behavior, and labor supply, as in *Barlevy* (2004), *Jones et al.* (2005), or *de Hek and Roy* (2001).

More recently, *Aghion et al.* (2005) show that a key to understanding the link between volatility and growth is the level of financial development. They show both theoretically and empirically that the presence of credit constraints makes volatility costly for growth.

Fatas and Mihov (2006) investigate the correlation and causality between macroeconomic volatility and economic growth using a cross-country regression. They have found robust negative correlation between fiscal policy volatility and economic growth.

EMPIRICAL STUDY OF MACROECONOMIC VOLATILITY AND ECONOMIC GROWTH FOR A SAMPLE OF CEE COUNTRIES

In this empirical study we test the correlation between macroeconomic performance and economic growth, and more importantly we address the question whether macroeconomic volatility influences economic growth for a sample of 22 CEE countries in the 2002-2014 period.

The issue that is of interest in this empirical research is how do we measure macroeconomic performance and macroeconomic volatility?

- Monetary policy volatility
- Fiscal policy volatility

MONETARY POLICY, VOLATILITY AND ECONOMIC GROWTH

Since data cover 22 countries, and the period from 2002 to 2012, we apply panel estimation techniques.

The econometric models that we estimate to test the influence of monetary policy volatility to economic growth for a sample of CEE countries have the following structure:

$$g = \gamma_0 + \gamma_1 \ln Init + \gamma_2 \log Bank + \gamma_3 WGI + \gamma_4 \log Ex + \gamma_5 Invest + \gamma_6 Inf + \varepsilon_i$$

$$g = \gamma_0 + \gamma_1 \ln Init + \gamma_2 \log Bank + \gamma_3 WGI + \gamma_4 \log Ex + \gamma_5 Invest + \gamma_6 Volatility + \varepsilon_i$$

CONT.

The outcome variable in the model is the rate of economic growth (growth rate of real GDP per capita), while the independent variables as determinants of economic growth for analyzed group of the CEE countries are:

1) Initial GDP per capita (logarithm of initial real GDP per capita;

2) Growth rate of *bank credit to private sector*;

3) *Institutional quality* measured by World Wide Governance Indicators – WGI;

4) *Export growth*;

5) The growth rate of *investment (*private and public capital investment);

6) *Inflation rate*; and

7) *Monetary policy volatility* measured by the standard deviation of inflation rate

OLS REGRESSION ESTIMATION

VARIABLES	(1) Growth rate	(2) Growth rate	(3) Growth rate (Robust stand. errors)	(4) Growth rate (Robust stand. errors)
Initial GDP per capita	-0.0158	-0.0343***	-0.0158*	-0.0343***
	(0.00994)	(0.0103)	(0.00953)	(0.00948)
Bankcredit growth	0.199***	0.176***	0.199**	0.176**
	(0.0611)	(0.0650)	(0.0876)	(0.0840)
WGI	0.173	0.187	0.173	0.187
	(0.151)	(0.162)	(0.158)	(0.160)
Export growth	0.00407**	0.00461**	0.00407*	0.00461***
	(0.00176)	(0.00180)	(0.00207)	(0.00171)
Investment growth	0.00815***	0.00685**	0.00815*	0.00685
	(0.00283)	(0.00295)	(0.00488)	(0.00491)
Inflation rate	0.00384***		0.00384**	
	(0.00147)		(0.00190)	
Monetary policy volatility		-0.00885***		-0.00885**
		(0.00334)		(0.00345)
Ramsey reset test (Ho: model has no omitted variables)				
Prob>F	0.0496	0.1665		
Link test (Ho: there in not specification error) p-value of _hatsq	0.002	0.044		
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity (Ho: Constant variance)				
Prob> chi2	0.000	0.0031		
Constant	0.198**	0.379***	0.198**	0.379***
	(0.0798)	(0.0803)	(0.0801)	(0.0767)
Observations	205	186	205	186
R-squared	0.4954	0.5195	0.4954	0.5195

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

PANEL DYNAMIC REGRESSION ESTIMATION - GMM

VARIABLES	(1) Growth rate	(2) Growth rate
Growth rate	0.205***	0.203***
L1.	(0.0195)	(0.0242)
Initial GDP per capita	-0.0745***	-0.0757***
	(0.0119)	(0.0147)
WGI	0.273***	0.425***
	(0.0506)	(0.0615)
Export growth	0.00733***	0.00727***
	(0.000613)	(0.000787)
Investment growth	0.0168***	0.0141***
	(0.00232)	(0.00246)
Inflation rate	0.00767***	
	(0.00125)	
Monetary policy volatility		-0.0177***
		(0.00292)
Sargan test of overidentifying restrictions (H0: overidentifying restrictions are valid)		
Prob> chi2	0.9976	0.9663
Observations	162	160
R-squared		
Number of ctry	22	22

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

FISCAL POLICY, VOLATILITY AND ECONOMIC GROWTH

The second hypothesis of our research is to test the relationship between fiscal policy volatility and economic growth for a sample of CEE countries.

The econometric technique to obtain the fiscal policy volatility variable:

$$Fiscal\ policy_t = \alpha + \beta Economic\ activity_{t,t} + \varepsilon_t$$

where, “Fiscal Policy” can be the overall central government balance or one of its components and “Economic Activity” is a measure of the cyclical stance of the economy (such as the output gap or output growth). The parameter measures the elasticity of budget components regarding economic fluctuations and economic outcomes, while the residual of the equation above, can be interpreted as the exogenous discretionary changes in fiscal policy.

OLS REGRESSION ESTIMATION

VARIABLES	(1) Growth rate	(2) Growth rate	(3) Growth rate (Robust stand. errors)	(4) Growth rate (Robust stand. errors)
Initial GDP per capita	-0.0420***	0.292***	-0.0420***	0.292***
	(0.00996)	(0.0615)	(0.00963)	(0.0582)
Bankcredit growth, %	0.147**	0.147**	0.147*	0.147*
	(0.0603)	(0.0603)	(0.0784)	(0.0784)
Institutional quality (rule of law)	0.179	0.179	0.179*	0.179*
	(0.109)	(0.109)	(0.107)	(0.107)
Export growth, %	0.00570***	0.00570***	0.00570***	0.00570***
	(0.00167)	(0.00167)	(0.00177)	(0.00177)
Investment growth, %	0.00624**	0.00624**	0.00624	0.00624
	(0.00273)	(0.00273)	(0.00450)	(0.00450)
Central Government debt	-0.00287***		-0.00287***	
	(0.000530)		(0.000520)	
Fiscal policy volatility		-0.334***		-0.334***
		(0.0617)		(0.0605)
Ramsey reset test (Ho: model has no omitted variables)Prob>F	0.6859	0.6859		
Link test (Ho: there in not specification error)p-value of _hatsq	0.843	0.843		
Breusch-Pagan Lagrange Multiplier LM test (Ho: Variances across entities is zero) Prob> chi2	0.2849	0.2849		
Constant	0.577***	-2.299***	0.577***	-2.299***
	(0.0906)	(0.512)	(0.0960)	(0.482)
Observations	186	186	186	186
R-squared	0.316	0.316	0.316	0.316

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

PANEL DYNAMIC REGRESSION ESTIMATION - GMM

VARIABLES	(1) Growth rate	(2) Growth rate
Growth rate	0.132***	0.135***
L1.	(0.0377)	(0.0195)
Institutional quality (rule of law)	0.282***	0.345***
	(0.0777)	(0.0438)
Investment growth	0.0148***	0.0123***
	(0.00240)	(0.00268)
Bank credit to private sector	0.0758*	0.145***
	(0.0434)	(0.0387)
Monetary policy volatility	-0.0150***	-0.0154***
	(0.00137)	(0.00250)
Central Government debt	-0.00680***	
	(0.000945)	
Fiscal policy volatility		-0.0828***
		(0.0216)
Constant	0.334***	0.128***
	(0.0366)	(0.0120)
Sargan test of overidentifying restrictions (H0: overidentifying restrictions are valid)		
Prob> chi2	0.9731	0.9784
Observations	160	160
R-squared		
Number of ctry	22	22

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

CONCLUSION

The estimated empirical results about monetary and fiscal policy volatility and economic growth indicate that there is a negative and statistically significant correlation between macroeconomic volatility and growth.

The empirical study of fiscal policy and discretion that governments have and exercise regarding changes in fiscal policy that are not related to the business cycle provide a strong message that the more discretion governments have, the more they will exercise it and it will cause unnecessary volatility and lower growth (an increase in fiscal policy volatility by 1 point will decrease the rate of economic growth by 0.334 and 0.0828 percent, respectively).

Additionally, the research about monetary policy volatility and economic growth indicates that countries with higher monetary policy volatility (measured by the standard deviation of inflation rate), have experienced lower growth rates in the analyzed period (an increase in monetary policy volatility by 1 point will decrease the rate of economic growth by 0.00885 and 0.0177 percent, respectively).